

USDA
NATURAL RESOURCES
CONSERVATION SERVICE
MARYLAND
CONSERVATION PRACTICE
STANDARD

RESIDUE MANAGEMENT;
NO-TILL AND STRIP TILL

CODE 329A
(Reported in Acres)

DEFINITION

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface year-round, while growing crops in narrow slots or tilled strips in previously untilled soil and residue.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following resource concerns:

- Reduce sheet and rill erosion.
- Reduce wind erosion.
- Maintain or improve soil organic matter content and tilth.
- Conserve soil moisture.
- Manage snow to increase plant available moisture or reduce plant damage from freezing.
- Provide food and escape cover for wildlife.

**CONDITIONS WHERE PRACTICE
APPLIES**

This practice applies to all cropland and other land where crops are grown.

This standard includes tillage and planting methods commonly referred to as no-till, zero till, slot plant, row till, zone till, or strip till.

CRITERIA

**General Criteria Applicable to All
Purposes**

Loose residues to be retained on the field shall be uniformly distributed on the soil surface. Cultivation and planting equipment designed to operate on ridges shall be used, such as cultivators equipped with ridging attachments, and planters equipped with ridge planting attachments such as row cleaning devices and guidance systems.

Residues shall not be disturbed except as follows:

Planters or drills shall be equipped to plant directly through untilled residue or in a narrow strip prepared by planter attachments such as rotary tillers, sweeps, multiple coulters, or row cleaning devices.

If row cultivation or spot treatment for weed escapes, leveling ruts, or similar operations become necessary, tillage shall be limited to operations which minimize burial of surface residue and shall be limited to specific areas where the problem exists.

**Additional Criteria to Reduce Sheet and
Rill Erosion**

The amount of residue needed to reduce erosion within the soil loss tolerance (T), or any other planned soil loss objective, shall be determined using the Revised Universal Soil Loss Equation (RUSLE) erosion prediction technology. Partial removal of residue by

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means such as baling or grazing shall be limited to retain the amount and distribution needed. Calculations shall account for the effects of other practices in the conservation management system.

Seedbed preparation, planting, and fertilizer placement should disturb no more than one fourth of the row width. To reduce the potential for erosion within rows, the row area formed by the planting operation should be level with or slightly above the adjacent row middles.

Additional Criteria to Reduce Wind Erosion

The amount and orientation of residue needed to reduce erosion within the soil loss tolerance (T), or other planned soil loss objective, shall be determined using current approved wind erosion prediction technology. Partial removal by means such as baling or grazing shall be limited to retain the amount and distribution needed. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Maintain or Improve Soil Organic Matter Content and Tillth

Erosion shall be not exceed the soil loss tolerance (T).

The cropping sequence must contain at least 50% perennial crops or 50% high residue producing crops.

Low residue producing crops in the rotation shall be planted using a conservation tillage method that retains a minimum of 50% residue surface cover after planting.

Cover crops shall be used in the crop sequence where prior crop residues after harvest provide less than 50% surface cover.

Partial removal by means such as baling or grazing shall be limited to retain the amount and distribution needed

Additional Criteria to Conserve Soil Moisture

A minimum of 50% residue surface cover shall be maintained throughout the year. Residue shall be evenly distributed and maintained on the soil surface. Partial removal by means such as baling or grazing shall be limited to retain the amount and distribution needed.

Additional Criteria to Manage Snow to Increase Plant Available Moisture or Reduce Plant Damage From Freezing

Stubble shall be left standing as high as possible by the harvesting operation, but not less than 6 inches in any case. Stubble shall be maintained standing over the winter to trap and retain snow. Loose residue may be removed providing the remaining residue is left standing.

When crops are planted in the fall, the width of the tilled strip or slot shall be no more than one fourth of the row width in order to reduce the disturbance of standing stubble.

Additional Criteria to Provide Food and Escape Cover for Wildlife

Residue height, amount, and time period shall be determined using an approved habitat evaluation procedure. Residues shall not be removed unless it is determined by the habitat evaluation procedure that removal would not adversely affect habitat values. Stubble shall be maintained standing over winter.

PLANNING CONSIDERATIONS

Partial removal of plant residue by such means as baling or grazing may produce negative impacts on resources. The effects of residue removal shall be considered when evaluating the impacts on soil, water, air, plant, and animal resources. These activities should not be performed if the result is excess removal of plant residues.

No-Till or strip till may be practiced throughout the crop sequence, or may be managed as part of a system which includes other tillage and planting methods such as mulch till. Maintaining a continuous No-Till system will maximize the improvement of soil organic matter content, particularly near the soil surface. Also, when No-Till is practiced continuously, soil reconsolidation provides additional resistance to sheet and rill erosion and ephemeral erosion.

Production of adequate amounts of crop residues necessary for the proper functioning of this practice can be enhanced by selection of high residue producing crops and crop varieties in the rotation, use of cover crops, and adjustment of plant populations and row spacing.

The value of residues for wildlife habitat can be enhanced by leaving rows of unharvested crop standing at intervals across the field.

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard. Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

OPERATION AND MAINTENANCE

Proper adjustment, operation, and maintenance of equipment is essential for successful implementation of this practice.

SUPPORTING DATA AND DOCUMENTATION

1. Identify resource concern(s) to be treated (see **PURPOSES**).
2. Ensure that field location, acreage, crop rotation and percent residue needed to address identified resource concern(s) are recorded as needed in the conservation plan.
3. Soil loss calculations if needed.

REFERENCES

1. Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder, coordinators. Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE). USDA Agricultural Handbook No. 703, 1997.
2. Maryland RUSLE Manual (FOTG), USDA NRCS, March, 1995.
3. National Handbook of Conservation Practices, USDA Natural Resources Conservation Service.
4. Conservation Research Report No. 41, Crop Residue Management To Reduce Erosion and Improve Soil Quality - Appalachia and Northeast, USDA Agricultural Research Service, Washington, D.C., August, 1995.
5. Lamarca, Carlos Crovetto. Stubble Over the Soil: The Vital Role of Plant Residue in Soil Management to Improve Soil Quality, 1996.
6. National Agronomy Manual, USDA Natural Resources Conservation Service.